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NOTES ON THE CLADONIAE OF CONNECTICUT

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(Continued from p. 142)

Subsection CHASMARIAE

Group MICROPHYLLAE

CLADONIA FURCATA (Huds.) Schrad. (p. 420). Essex (1931) and Middlebury (*Musch & Evans*, 1929). These specimens are not definite as to form.

CLADONIA FURCATA var. RACEMOSA (Hoffm.) Floerke (p. 422). Essex (1931), Granby (*Musch & Evans*, 1930), Lyme (1930, 1931), Milford (1931), North Branford (1931), and Wallingford (1931).

CLADONIA FURCATA var. RACEMOSA f. FURCATOSUBULATA (Hoffm.) Vainio (p. 422). Essex (1931).

CLADONIA FURCATA var. RACEMOSA f. CORYMBOSA (Ach.) Vainio (p. 423). North Canaan (1931).

*CLADONIA FURCATA var. RACEMOSA f. FISSA (Floerke) Aigret, Bull. Soc. Roy. Bot. Belgique **40**: 109. 1901 (as *C. furcata* α . *racemosa* aa. *fissa*); Anders, Strauch- und Laubfl. Mitteleuropas **73**. pl. 9, f. 2. 1928. *C. furcata* ζ . *fissa* Floerke, Clad. Comm. 151. 1828.

On soil in open woods, North Branford (1931). Not before reported for North America.

The podetia of var. *racemosa*, especially if fertile, are often more or less split lengthwise, as indicated in the writer's report under f. *corymbosa*. In f. *fissa* the splitting affects the podetia throughout a considerable part of their entire length and gives them a very distinctive appearance.

CLADONIA FURCATA var. RACEMOSA f. SQUAMULIFERA Sandst. in Rabenhorst, Kryptogamen-Flora **9**, Abt. 4²: 201. pl. 12, f. 6. 1931.

On shaded earth, often over rocks. Bethany (1931), Brookfield (*Anna C. Murphy*, no date), Killingworth (1931), Lyme (1930, 1931),

Milford (1931), North Branford (*Musch & Evans*, 1927; Evans, 1931), Seymour (*Musch & Evans*, 1928), Stamford (1928), and Winchester (1931). Several of these specimens were determined by Dr. Sandstede; those dated 1928 or earlier are listed in the writer's report (p. 424) under *C. furcata* var. *pinnata*.

Most students of the Cladoniae refer glaucescent forms of *C. furcata* to var. *racemosa*, if podetial squamules are lacking, and to var. *pinnata*, if such squamules are present. This course was followed by the writer in his report. Sandstede, however, separates these two varieties mainly on the basis of differences in the cortex. According to his account¹⁷ the cortex of the podetia in var. *racemosa* is smooth and subcontinuous, while that of var. *pinnata* is broken up more or less, frequently by transverse splits. If this distinction is emphasized the presence of squamulose conditions of var. *racemosa* must be recognized. These constitute Sandstede's f. *squamulifera*.

CLADONIA FURCATA var. PINNATA (Floerke) Vainio f. FOLIOLOSA (Del.) Vainio (p. 424). North Branford (1931).

CLADONIA FURCATA var. PALAMAEA (Ach.) Vainio (p. 425). North Branford (1931), North Canaan (1931), and Old Saybrook (1931).

CLADONIA SCABRIUSCULA (Del.) Leight. f. FARINACEA (Vainio) Sandst. (p. 427). Essex (1931, det. Sandstede), North Branford (1931), Wallingford (1931), and Winchester (1931).

CLADONIA MULTIFORMIS Merrill f. FINKII (Vainio) Evans (p. 429). Granby (*Musch & Evans*, 1930).

CLADONIA CRISPATA (Ach.) Flot. f. ELEGANS (Del.) Vainio (p. 431). Madison (1931, det. Sandstede) and Old Saybrook (1931).

CLADONIA SQUAMOSA (Scop.) Hoffm. (p. 432). Bethany (1931), Essex (1931), and Wilton (1931). Not definite as to form.

CLADONIA SQUAMOSA f. DENTICOLLIS (Hoffm.) Floerke (p. 434). Kent (1931), Killingworth (1931), and Old Lyme (1930).

CLADONIA SQUAMOSA f. PHYLLOCOMA (Rabenh.) Vainio (p. 434). Bethany (1931).

CLADONIA SQUAMOSA f. LEVICORTICATA Sandst. (p. 435). Bethany (1931, det. Sandstede).

CLADONIA SQUAMOSA f. LEVICORTICATA Sandst. m. PSEUDOCRISPATA Sandst. (p. 436). Bethany (1931).

CLADONIA SQUAMOSA f. LEVICORTICATA m. RIGIDA (Del.) Evans (p. 436). Essex (1931) and Bethany (1931).

CLADONIA SQUAMOSA f. MUCRONATA Vainio (p. 436). Suffield (*Musch & Evans*, 1931).

*CLADONIA CENOTEA (Ach.) Schaer. Lich. Helv. Spic. 35. 1823. *Baeomyces cenoteus* Ach. Meth. Lich. 345. 1803.

The species grows in bogs and in open woods, often on decayed

¹⁷ In Rabenhorst, Kryptogamen-Flora 9, Abt. 4²: 197-207. 1931.

stumps. It is widely distributed in the northern and mountainous parts of Europe and in the northern parts of North America and Asia. It has been reported also from Australia. Its known range in North America, according to the literature, extends from Greenland and Alaska southward to Massachusetts, Minnesota, and the Cascade Mountains.

The podetia of *C. cenotea*, which are cylindrical and erect, form narrow perforate cups, the margins of which are more or less incurved. They are further distinguished by the presence of abundant soredia, whitish gray or greenish gray in color. These are found from the apex downward, sometimes as far as the base but usually to a variable distance above the base. The portion free from soredia is usually corticate, at least when young, and may be more or less squamulose. The podetia are usually unbranched below the cups, but the margins of the cups often give off one to several erect or suberect proliferations, which are either pointed or tipped with narrow cups. The species is negative with KOH and mild to the taste. The Connecticut specimens are referable to the following form:

*CLADONIA CENOTEA f. EXALTATA Nyl. in Rehm, Clad. Exsic. 312. 1885; Vainio, Acta Soc. F. et Fl. Fennica 4:481. 1887 (as β . *exaltata*).

In a bog, Suffield (*Musch & Evans*, 1930, det. Sandstede).

Robust specimens of f. *exaltata*, collected by D. L. Dutton at Brandon, Vermont, have been distributed by Merrill (Lich. Exsic. 48), and excellent figures have been published by Anders¹⁸ and by Sandstede.¹⁹ The podetia are usually longer and more slender than in var. *crossota* (Ach.) Nyl., which represents the species in its more typical development. They usually attain a considerable height before the primary cups with their proliferations are formed, and the total height is often 5 cm. or more, although shorter podetia are not uncommon. The diameter is usually 0.5–3 mm. The cups, although clearly perforate, are scarcely dilated, and those formed by the proliferations are little more than truncate, perforate apices. Some of the proliferations, in fact, may be pointed at the tips. Most of the proliferations are more or less squamulose at the base, and the squamules, which are variously laciniate or lobate, sometimes develop marginal soredia. Sandstede points out that f. *exaltata* is connected with *C. glauca* by intergrading forms²⁰ and suggests that

¹⁸ Strauch-und Laubfl. Mitteleuropas pl. 12, f. 4. 1928.

¹⁹ In Rabenhorst, Kryptogamen-Flora 9, Abt. 4²: pl. 21, f. 3. 1931.

²⁰ *Op. cit.* 300.

it might perhaps be better included under *C. glauca* than under *C. cenotea*.

CLADONIA GLAUCA Floerke f. CAPREOLATA (Floerke) Sandst. (p. 438). Bethany (1931).

CLADONIA DELICATA (Ehrh.) Floerke f. QUERCINA (Pers.) Vainio (p. 439). Bethany (1931), Colebrook (1931), East Haven (1931), Lyme (1931), North Branford (1931), North Haven (1931), Old Saybrook (1931), and Wallingford (1931).

CLADONIA CAESPITICIA (Pers.) Floerke (p. 439). Middlebury (*Musch & Evans*, 1929), New Haven (1931), North Branford (1931), Old Saybrook (1931), and Wallingford (1931).

Group MEGAPHYLLAE

CLADONIA APODOCARPA Robbins (p. 440). Brookfield (1928), Lyme (1930), Milford (1931), Old Lyme (1927), Saybrook (*Musch & Evans*, 1928, not new to the town), and Wallingford (1931). The specimens dated 1928 or earlier are listed in the writer's report under *C. foliacea* var. *alcicornis* (p. 486), but the determinations have been corrected by Dr. Sandstede.

Subsection CLAUSAE

Group PODOSTELIDES

Subgroup HELOPODIUM

CLADONIA MITRULA Tuck. f. IMBRICATULA (Nyl.) Vainio (p. 444). East Haven (1931), Essex (1931), Lyme (1930), North Haven (1931), and Wallingford (1931; previously collected by Barron).

CLADONIA MITRULA f. PALLIDA Robbins (p. 445). North Branford (1931), North Haven (1931), and Wallingford (1931).

CLADONIA CLAVULIFERA Vainio f. NUDICAULIS Evans (p. 447). Greenwich (1931), North Branford (1931), Old Saybrook (1931), Suffield (*Musch & Evans*, 1930), and Wallingford (1931).

CLADONIA CLAVULIFERA f. SUBVESTITA Robbins (p. 447). North Branford (1931), Old Saybrook (1931), and Wilton (1931).

CLADONIA *clavulifera* f. *pleurocarpa* Robbins (p. 447). North Haven (1931) and Old Saybrook (1931).

CLADONIA CLAVULIFERA f. SUBFASTIGIATA Robbins (p. 448). Old Saybrook (1931).

CLADONIA CLAVULIFERA f. EPIPHYLLA Robbins (p. 448). Old Saybrook (1931).

CLADONIA SUBCARIOSA Nyl. f. EVOLUTA Vainio (p. 450). Bethany (1931), East Haven (1931), Fairfield (1931), Lyme (1931), Milford (1931), and Wilton (1931).

CLADONIA SUBCARIOSA f. SQUAMULOSA Robbins (p. 451). Bethany (1931), Fairfield (1931), Lyme (1931), Milford (1931), and Wilton (1931).

*CLADONIA BREVIS Sandst. Clad. Exsic. 401. 1919; Abhandl.

Naturw. Ver. Bremen **25**: 192. 1922. *C. verticillata-cervicornis* f. *brevis* Sandst. Clad. Exsic. 234. 1918. *C. alpicola* var. *karelica* of American authors (see p. 453).

On sandy soil, sometimes over rocks. North Haven (1931), Old Saybrook (1931), Shelton (1928, not previously reported), and Windsor (1928). The last specimen is listed as *C. alpicola* var. *karelica* (p. 453), but the specimen from Madison listed under the same name represents *C. strepsilis* var. *glabrata*, as indicated below.

After an examination of North American specimens referred to *C. alpicola* var. *karelica* Vainio the writer became convinced that they belonged in the subgroup Helopodium rather than in the subgroup Macropus. Since *C. alpicola* is clearly a member of the subgroup Macropus it became evident that these specimens ought not to be included under *C. alpicola* as a variety. This conclusion was submitted to Dr. Sandstede for his opinion. He very kindly pointed out that the var. *karelica* was still a questionable plant, that it was very similar to his *C. brevis*, and that it might perhaps be identical with it. A careful comparison of the North American specimens with the numerous specimens of *C. brevis* in his exsiccati failed to bring out any essential differences between them. These specimens, therefore, so far as the Connecticut material is concerned, are listed above under *C. brevis*.

Whether Vainio's *C. alpicola* var. *karelica* should be regarded as a simple synonym of *C. brevis* is another question. Vainio based his variety on material collected in northern Karelia and afterwards referred to it a series of specimens from Sweden, Germany, and France. These specimens have not been seen by the writer, but Vainio's full description²¹ would apply in most respects to the North American material. Even if the identity between *C. brevis* and the European *C. alpicola* var. *karelica* should be established, however, the name *C. brevis* ought to be maintained, since the plant has never been described, as a species, under the name *karelica*.

The range of *C. brevis* is still incompletely known. The specimens distributed under this name by Sandstede in his exsiccati were all collected in Oldenburg, but he reports the species also from a few other European stations and from Japan. It is apparently a plant of low altitudes and, in Connecticut, seems to prefer shallow depressions in sandy regions with scattered shrubs or small pines. In such localities it often grows, sometimes in intimate admixture, with *C. clavulifera*, *C. strepsilis*, and *C. mateocyatha*. The following

²¹ Acta Soc. F. et Fl. Fennica **10**: 65. 1894.

North American specimens, distributed in exsiccati, represent *C. brevis*: Merrill, Lich. Exsic. 199 (as *C. symphycarpa*), South Thomaston, Maine, collected by G. K. Merrill; and Sandstede, Clad. Exsic. 1474 (as *C. alpicola-karelica*), Wareham, Massachusetts, collected by C. A. Robbins. Aside from Merrill's figure, which has already been cited (p. 453), the fine illustration of Sandstede may be consulted.²²

The primary thallus of *C. brevis*, according to Sandstede, consists of roundish, crenate squamules, either appressed to the substratum or ascending. They are wrinkled and olive green or brownish on the upper surface, while the lower surface is white. The spermagonia, which are subspherical and blackish, are either sessile on the squamules or else borne on isidium-like outgrowths. In the North American specimens the color of the squamules, although often olive green or brownish, is sometimes glaucescent, and the few spermagonia observed have all been sessile. Otherwise the thallus is in close agreement with Sandstede's account.

The podetia are sometimes more robust than the published descriptions indicate and may attain a height of 1.5–2 cm. and a diameter of 4 mm. just below the apothecia. Often, however, they are considerably less than 1 cm. in height. When their flat areolae are scattered the regions separating them often acquire a translucent appearance, owing to the exposure of the inner medullary layer. In old plants this layer sometimes becomes conspicuously fissured, agreeing in this respect with *C. cariosa*. The negative reaction with KOH, however, will at once distinguish *C. brevis* from *C. cariosa*, which yields a definite yellow color. Both species are mild in taste

Subgroup MACROPUS

*CLADONIA DECORTICATA (Floerke) Spreng. in Linnaeus, Syst. Veg. ed. 16, 4: 271. 1827. *Capitularia decorticata* Floerke, Weber & Mohr's Beiträge 2: 297. 1810.

On earth over rocks, Branford (1928, det. Sandstede).

The specimens grew in association with *C. nemoxya* and are reported under that name (p. 476). Vainio gives many European stations for *C. decorticata* and records the species also from Japan, Madeira, and the White Mountains, basing the last report on specimens distributed by Tuckerman (Lich. Am. Sept. Exsic. 124. 1854). Additional North American stations in Canada, Alaska, New York, and Minnesota are cited in the literature.

²² In Rabenhorst's Kryptogamen-Flora 9, Abt. 4²: pl. 22, f. 7. 1931.

The most important characteristics of *C. decorticata* are brought out by the writer in connection with the closely related *C. Norrlini* Vainio (p. 454). This species gives a distinct yellow with KOH, while *C. decorticata* is negative.

Group THALLOSTELIDES

CLADONIA VERTICILLATA (Hoffm.) Schaer. f. EVOLUTA (Th. Fr.) Stein (p. 459). Bethany (1931), Essex (1931), North Haven (1931), and Old Saybrook (1931).

CLADONIA VERTICILLATA f. APOTICTA (Ach.) Vainio (p. 460). Madison (1931).

CLADONIA MATEOCYATHA Robbins f. LEIOSCYPHA Evans (p. 462). Essex (1931) and Old Saybrook (1931).

CLADONIA MATEOCYATHA f. SQUAMULATA Robbins (p. 462). North Branford (1931).

CLADONIA PYXIDATA (L.) Hoffm. var. NEGLECTA (Floerke) Mass. (p. 463). Winchester (1931).

CLADONIA PYXIDATA var. NEGLECTA f. SIMPLEX (Ach.) Harm. (p. 464). Essex (1931), Lyme (1930, 1931), North Branford (1931), and North Haven (1931).

CLADONIA PYXIDATA var. POCILLUM (Ach.) Flot. (p. 465). Milford (1931) and Wallingford (1931); both specimens were determined by Sandstede.

CLADONIA CHLOROPHAEA (Floerke) Spreng. (p. 465). Essex (1931, det. Sandstede).

CLADONIA CHLOROPHAEA var. PACHYPHYLLINA (Wallr.) Vainio (p. 472). North Branford (*Musch & Evans*, 1927, listed on p. 469 as f. *costata*, determination corrected by Sandstede).

*CLADONIA GRAYI Merrill in Sandstede, *Clad. Exsic. 1847*. 1929; Sandstede in Rabenhorst, *Kryptogamen-Flora* 9, Abt. 4²: 426. 1931.

On earth, logs, and tree-bases, often on thin soil over rocks. East Haddam (1927), Essex (1931), Fairfield (1931), Granby (*Musch & Evans*, 1930), Greenwich (1931), Killingworth (1931), Lyme (1931), Madison (1927), Milford (1931), North Branford (1931), Old Lyme (1927, 1930), Old Saybrook (1931), Suffield (*Musch & Evans*, 1930), Westbrook (1927), Wilton (1931), and Winchester (1931). The determinations were all made by Dr. Sandstede; stations dated 1927 or earlier are listed in the writer's report under *C. chlorophaea* or one of its forms. It is probable that other specimens listed under *C. chlorophaea* represent *C. Grayi* instead.

The type specimens of *C. Grayi* were collected by Fred W. Gray at Long Creek, near Charlotte, North Carolina (misprinted "N. Virg." on the label), in 1928; and the following additional specimens from Sandstede's exsiccati may be cited: No. 1468, from Brandon, Vermont, collected by D. L. Dutton in 1925; and No. 1757, from

Sweden, collected by E. P. Vrang in 1927. These two specimens were originally distributed as *C. chlorophaea*. Sandstede reports the species also from Germany, Czechoslovakia, Tirol and Russia. In North America it seems to be even commoner than in Europe and is already known from several states east of the Mississippi River.

The validity of *C. Grayi* is perhaps still open to question, since there is little to distinguish it morphologically (according to our present knowledge) from *C. chlorophaea*. The most important distinction between the two is chemical in nature and is based on the presence of fumarprotocetraric acid in *C. chlorophaea*. This species, therefore, is bitter to the taste, while *C. Grayi*, owing to the absence of fumarprotocetraric acid, is mild. It is of course possible that adequate morphological distinctions may be demonstrated in the future.

*CLADONIA GRAYI f. SQUAMULOSA Sandst. in Rabenhorst, Kryptogamen-Flora 9, Abt. 4: 429. 1931.

On earth, sometimes over rocks. Branford (1928), North Branford (1931), Old Lyme (1928), Old Saybrook (1931), Shelton (1928), Stamford (1928), Wallingford (1931), and Westbrook (1927). These specimens were all determined by Dr. Sandstede, and all, except the one from Old Saybrook, are listed in the writer's report under *C. chlorophaea* or under its f. *lepidophora*.

The podetia of f. *squamulosa* are characterized by being more or less squamulose.

CLADONIA CONISTA (Ach.) Robbins f. SIMPLEX Robbins (p. 473). Colebrook (1931, determined by Sandstede as *C. fimbriata conista*) and Madison (1931).

CLADONIA FIMBRIATA (L.) Fr. (p. 473). Granby (*Musch & Evans*, 1930).

CLADONIA NEMOXYNA (Ach.) Nyl. (p. 475). Essex (1931), Lyme (1930), New Haven (1931), and Old Saybrook (1931).

CLADONIA NEMOXYNA f. FIBULA (Ach.) Vainio (p. 477). North Branford (1931).

CLADONIA CONIOCRAEA (Floerke) Spreng. f. CERATODES (Floerke) Dalla Torre & Sarnth. Bethany (1931), Colebrook (1931), Lyme (1931), New Haven (1931), and Wallingford (1931).

CLADONIA CONIOCRAEA f. TRUNCATA (Floerke) Dalla Torre & Sarnth. (p. 480). Lyme (1931), Madison (1931), Wallingford (1931), and Winchester (1931).

*CLADONIA CONIOCRAEA f. EXPANSA (Floerke) Sandst. Abhandl. Naturw. Ver. Bremen 25: 228. 1922 (as modification); in Rabenhorst, Kryptogamen-Flora 9, Abt. 4²: 448. 1931 (as form). *C. pyxidata* * δ . *expansa* Floerke, Clad. Comm. 68. 1828.

On soil in woods, often at bases of trees. Killingworth (1931, det. Sandstede, first collection for Connecticut) and North Branford (1931). Not before reported from North America.

The primary squamules of f. *expansa* are unusually large and often assume an ascending position with the upper surface more or less concave. The lower surface is chalky white, sometimes with a faint yellowish tint, and gradually becomes pale yellow when KOH is added. The podetia are like those of f. *ceratodes*.

*CLADONIA CONIOCRAEA f. ROBUSTIOR (Harm.) Sandst. in Rabenhorst, Kryptogamen-Fl. 9, Abt. 4²: 448. 1931. *C. ochrochlora* f. *ceratodes* s. f. *robustior* Harm. Bull. Soc. Sci. Nancy II. 14: 380. 1896. *C. fimbriata* var. *ochrochlora* f. *robustior* Zahlbr. Cat. Lich. Univ. 4: 504. 1927.

At base of tree, North Branford (1931, det. Sandstede). New to North America.

The podetia of f. *robustior* are pointed, as in f. *ceratodes*, but are stouter, the diameter in the middle being often 2.5–3 mm. The Connecticut specimens are associated with the preceding form.

*CLADONIA CONIOCRAEA f. PYCNOTHELIZA (Nyl.) Vainio, Acta Soc. F. et Fl. Fennica 53¹: 113. 1922. *C. pycnotheliza* Nyl. Flora 58: 441. 1875. *C. fimbriata* ε^3 . *pycnotheliza* Vainio, Acta Soc. F. et Fl. Fenn. 10: 330. 1894; Zahlbruckner, Cat. Lich. Univ. 4: 505. 1927 (as variety).

On earth over rocks and on tree-bases. North Branford (1931) and Old Saybrook (1931, det. Sandstede, first collection for Connecticut).

The f. *pycnotheliza* represents an abnormal condition in which a super-abundance of apothecia, often more or less aborted, is produced. These apothecia, which are either sessile or stalked, are sometimes borne on primary squamules and sometimes on podetia, where they are often lateral in position. The podetia are more or less soresiose but usually show corticate areas and may be squamulose in varying degrees. In many cases they are curved or otherwise distorted. The various types of apothecia found in f. *pycnotheliza* are described and figured by Bachmann.²³

CLADONIA BORBONICA (Del.) Nyl. f. CYLINDRICA Evans (p. 482). Bethany (1931), Fairfield (1931), Madison (1931), North Haven (1931), Old Saybrook (1931), Wallingford (1931), and Wilton (1931).

CLADONIA BORBONICA f. SQUAMULOSA Robbins. (p. 482). Wallingford (1931).

CLADONIA PITYREA (Floerke) Fr. var. ZWACKHII Vainio f. EPIPHYLLA

²³ Über Pyknothelizie bei *Cladonia*. Ber. Deutsch. Bot. Ges. 41: 103–107. f. 1–6. 1923.

(Sandst.) Evans (p. 484). North Branford (1931, det. Sandstede) and Old Saybrook (1931).

CLADONIA PITYREA var. ZWACKHII f. SUBACUTA Vainio (p. 485). Bethany (1931), Madison (1931), Middlebury (*Musch & Evans*, 1929), Milford (1931), and North Branford (1931).

CLADONIA PITYREA var. ZWACKHII f. SQUAMULIFERA Vainio (p. 485). Bethany (1931), Madison (1931), Middlebury (*Musch & Evans*, 1929), Milford (1931), North Branford (1931), Old Lyme (1930), and Wallingford (1931).

Group FOLIOSAE

CLADONIA STREPSILIS (Ach.) Vainio (p. 487). Branford (1928, not new to the town). Clinton (1927), Essex (1927), Granby (*Musch & Evans*, 1930), New Milford (1928), North Branford (1927, 1931), Old Saybrook (*Musch & Evans*, 1928), Portland (*Dunlap*, 1927), Westbrook (1927), and Winchester (1931). The specimens consist of the thallus only; those dated 1928 or earlier are listed by the writer (p. 486) under *C. foliacea* var. *alcicornis*.

In separating *C. foliacea* from *C. strepsilis* the writer, in his key, emphasized the difference in width of the primary squamules and the difference in chemical reaction. As a matter of fact, however, broad primary squamules, by themselves, were considered sufficient to distinguish *C. foliacea* var. *alcicornis* from *C. strepsilis*, especially if the lower surface of the squamules was cream color. The variety, in consequence, was reported from fifteen different Connecticut towns. It now appears that most of the specimens upon which these records were based give the reaction characteristic of strepsilin, and that they should therefore be referred to *C. strepsilis*, rather than to *C. foliacea*. The specimens, which do not give this reaction, have squamules with a very pale lower surface, which turns yellow with KOH. These specimens represent *C. apodocarpa*, rather than *C. foliacea*. The latter species thus disappears, at least temporarily, from the Connecticut flora.

The writer's attention was called to these errors in determination by Dr. Sandstede, who corrected several of the Connecticut specimens sent to him under the name *C. foliacea* var. *alcicornis*. The other specimens in the Yale Herbarium were then examined with the result indicated above. Some of the specimens approach f. *megaphyllina*.

The characteristic reaction for strepsilin is the verdegriis green color obtained when plants are treated with CaCl_2O_2 in the presence of KOH. The color sometimes appears very slowly, and a hasty observation might lead to the conclusion that the reaction was

negative. A good procedure is to soak the material thoroughly with water, if dried specimens are used, then to add a few drops of saturated KOH solution, and finally to apply a little fresh CaCl_2O_2 in solid form. The addition of water sometimes hastens the appearance of the green color.

CLADONIA STREPSILIS f. GLABRATA Vainio (p. 488). Essex (1931), Lyme (1931), Madison (1927, listed on p. 453 as *C. alpicola* var. *karelica*), North Branford (1931), Old Saybrook (1931), and Wilton (1931).

CLADONIA STREPSILIS f. CORALLOIDEA (Ach.) Vainio (p. 489). *C. foliacea* var. *alcicornis* f. *squamulosa* Evans, Trans. Connecticut Acad. 30:487. 1930. Hamden (1931), Lyme (1931), North Branford (1931), Old Lyme (1927, listed on p. 487 as *C. foliacea* var. *alcicornis* f. *squamulosa*; 1930), Suffield (*Musch & Evans*, 1930), and Wilton (1931). The determination of the specimens from Old Lyme was revised by Dr. Sandstede; the plants show broad primary squamules, which give the reaction for strepsilin.

*CLADONIA STREPSILIS f. COMPACTA Anders, Strauch-und Laubfl. Mitteleuropas 117. 1928.

On rocks, Greenwich (1931, det. Sandstede). Not before recorded from North America.

The primary squamules of f. *compacta* are small, thick, and densely crowded together, so that they form small and compact, cushion-like colonies. These grow on bare rocks exposed to the sun and are usually completely sterile.

*CLADONIA STREPSILIS f. MEGAPHYLLINA Harm. Bull. Soc. Sci. Nancy II. 14: 386. pl. 4, f. 7. 1896. *C. strepsilis*, f. *subalcicornis* Anders, Hedwigia 61:369. 1920.

On sandy soil, North Branford (1931, det. Sandstede). This is apparently the first report for North America.

The primary squamules of this form are unusually large, sometimes attaining a length of 1.5 cm. They form extensive, rather loose, irregular colonies. The squamules tend to be suberect, so that the cream-colored lower surface stands out conspicuously, especially in dry weather. The form bears a strong resemblance to *C. foliacea* var. *alcicornis*, and the writer's remarks concerning this variety (p. 487) would apply equally well to f. *megaphyllina*.

Group OCHROLEUCAE

CLADONIA PIEDMONTENSIS Merrill f. OBCONICA Robbins (p. 491). Old Saybrook (1931).

CLADONIA PIEDMONTENSIS f. SQUAMULOSA Robbins (p. 491). Essex (1931), North Branford (1931), and Old Saybrook (1931).

CLADONIA PIEDMONTENSIS f. LEPIDIFERA (Vainio) Robbins (p. 491). Essex (1931), Granby (*Musch & Evans*, 1930), Madison (1931), North Branford (1931), and Old Saybrook (1931).

*CLADONIA PIEDMONTENSIS f. SQUAMOSISSIMA Robbins, *Rhodora* 31: 104. *pl.* 187, *f.* 13. 1929.

Among mosses in an old field, Old Saybrook (1931).

The podetia of this form are densely squamulose, with sterile or sparsely fruited tips.

Collections of Cladoniae have now been made in 99 of the Connecticut towns, leaving a residue of 70 towns still to be heard from. At the close of 1928 collections had been made in 95 towns, so that only 4 new towns have been added to the list. Most of the progress made during the past three years is, in consequence, based on the more intensive exploration of certain towns from which Cladoniae had already been recorded.

In the 1930 report (p. 498) 18 towns were listed in each of which 16 or more species had been collected; this number is now increased to 23. The town standing at the head of the list was North Canaan, with 27 species to its credit; this position is now occupied by the town of North Branford, with 35 species. The other towns, with over 20 species each to their credit, are the following: Madison, 33 species; Old Saybrook, 32; North Canaan and North Haven, 27 each; Branford, 26; East Hampton 25; Bethany and Stamford, 23 each; Beacon Falls, Essex, and Wallingford, 22 each; and Lyme, 21.

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BARTONIA; A COMEDY OF ERRORS

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THE little gentianaceous genus *Bartonia* was clearly and very fully described by Muhlenberg¹ in 1801, with a single species, *B. tenella* Willd. In 1803, Michaux² independently described the genus as *Centaurella* with two species, *C. verna* and *C. paniculata*, both clearly illustrated. It was subsequently shown that *B. tenella* Willd.³ (1801)

¹ Muhl. in Willd. *Ges. Naturf. Freunde Berlin, Neue Schrift.* iii. 444 (1801).

² Michx. *Fl. Bor.-Am.* i. 97, 98, t. 12, figs. 1 and 2 (1803).

³ The binomial *B. tenella* is often ascribed to Muhlenberg but, when he described it Willdenow, who credited the generic name to Muhlenberg, said nothing of Muhlenberg's having given the specific name as well. Willdenow said in introducing the specific diagnosis: "Es ist mir nur eine Art bekannt nemlich: BARTONIA *tenella*." It would seem that Willdenow should stand as author of the binomial.